

one another to close the electrical path between electrical terminals such as the terminals 112 and 114. However, it is noted that a large variety of contact patterns can be used in the present invention.

The second layer of the laminate switch assembly or keyboard 100 comprises an electrically insulating spacer 116 which has circular openings 118 aligned with the contact patterns 102 formed on the circuit board 101. The circular apertures 118 may be interconnected by channels 120 to permit air to pass between the individual switches of the laminate keyboard 100. Such movement of air between the switches of the laminate keyboard 100 facilitates operation in the event that the keyboard is sealed and deflection of the tensioned domes would otherwise be resisted by the trapped air within the domes.

The third layer of the laminate keyboard 100 is constructed from a sheet 122 of electrically insulating material, such as Mylar, and includes electrically conducting pads 124 on the underside of the sheet 122. The electrically conducting pads 124 are aligned with the holes 118 in the insulator 116 and the contact patterns 102. The conducting pads 124 are circular in the illustrative embodiment and can be performed and adhered to the undersurface of the sheet 122 or can be formed or deposited onto the underside of the sheet 122.

The fourth layer of the laminate keyboard 100 comprises a second electrically insulating spacer 126 comparable to the sheet 116. The spacer 126 again is constructed from an insulating material and includes circular openings 128 centered upon the contact patterns 102. Here, again, the circular openings 128 may be interconnected by channels 130 for air movement within the laminate keyboard as previously described.

The fifth layer of the laminate keyboard 100 comprises the tensioned dome switch plate 132 which is preferably formed from commercially available thermoplastic material such as that offered under the trademark Lexan registered to the General Electric Company. A plurality of tensioned domes 134 are formed into the surface of the thermoplastic material which forms the tensioned dome switch plate 132. In accordance with the present invention, each of the tensioned domes 134 is surrounded by a stress relief collar or band 136 to improve the durability and life expectancy of the switch plate 132 and, hence, the laminate keyboard 100 incorporating the tensioned dome switch plate 132.

The tensioned domes 134 extend above the collars 136. The collars 136 serve to buffer and relieve the stresses which are otherwise created in that portion of the switch plate 132 which extends between the edge of the tensioned domes 134 and the planar surface 138 of the switch plate 132. The structure of the individual layers of the laminate keyboard of the illustrative embodiment of the invention of FIG. 1 is shown in more detail in a cross-sectional view through one of the switches of the laminate keyboard 100 in FIG. 2.

The stress relief collar or band 136 shown in FIG. 1 is concentric with the outer edge of the tensioned dome 134 which it surrounds. Of course, in accordance with the present invention, the collar 136 can be square as shown by the dotted line figure 140 or can take other geometric forms surrounding the tensioned domes 134. Advantageously, by surrounding each of the tensioned domes 134 with a collar 136, the durability of the dome switch plate 132 is increased. The collars 136 tend to buffer and relieve the strain which is normally produced by flexure of the tensioned domes 134 upon oper-

ation of the associated switches so that the areas which interconnect the tensioned domes 134 to the planar areas 138 of the dome switch plate 132 have a longer life expectancy.

While disclosed in a five layer laminate switch or keyboard assembly, the present invention may be included in a variety of embodiments. One or both of the spacers 116 and 126 can be eliminated and the conductive pads 124 can be incorporated into the inner surfaces of the tensioned domes 134 by deposition or formation of conductive material 142 on the inner surfaces of the domes. These as well as other modifications and alternate embodiments will be apparent to those skilled in the art from the above description.

While the forms of apparatus herein described constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to these precise forms of apparatus and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A laminate switch assembly comprising:
 - a printed circuit board having at least one pair of electrical contact areas formed thereon;
 - a tactile dome switch plate having a tensioned tactile dome aligned with each pair of said at least one pair of electrical contact areas on said circuit board and a reinforcing band encircling each tactile dome; and
 - contact means interposed between said circuit board and said switch plate for interconnecting an aligned pair of contact areas upon depression of an associated tensioned tactile dome whereby an electrical connection is completed through said aligned pair of contact areas by depressing said associated tensioned tactile dome and stresses created in said switch plate between said associated tensioned tactile dome and the remainder of said switch plate due to the flexure of said associated tensioned tactile dome are relieved by said reinforcing band which remains substantially stationary compared to the movement of said tactile dome upon depression and release of said associated tensioned tactile dome.
2. The laminate switch assembly of claim 1 wherein said contact means comprises an electrically conductive coating on the interior surface of said associated tensioned tactile dome.
3. The laminate switch assembly of claim 1 wherein said tensioned tactile dome and said reinforcing band are approximately equal in thickness and are formed into said switch plate.
4. The laminate switch assembly of claim 3 wherein said switch plate is formed of a thermoplastic material.
5. The laminate switch assembly of claim 4 wherein a key designation is formed into said tensioned tactile dome and said reinforcing band is formed of a contrasting color whereby a permanent key designation and a pleasing appearance can be imparted to said laminate switch assembly.
6. A laminate switch assembly comprising:
 - a printed circuit board having a plurality of intermeshed pairs of electrical contact areas formed thereon;
 - a first electrically insulating spacer covering said circuit board and including apertures therethrough aligned with each of said pairs of electrical contact areas;